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## About the Authors

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# Sino-Indian Border Infrastructure: An Update<sup>1</sup>

## Introduction

**I**t is widely acknowledged that the 21st century will be an Asian century. The simultaneous rise of/re-emergence of major powers in Asia—China, Japan, Russia and India—provides opportunities and challenges. Asia has major military powers—six out of nine nuclear powers are in Asia—and some of the fastest growing economies in the world. While the rise of the “rest” as Fareed Zakaria noted in his book has been important, the rise of China in the last decade has been most dramatic. China's rise—with significant output in the economic, military and strategic spheres—has given shape to an Asia that is characterised by cooperation, competition and (potential for) conflict. In addition, the relative decline of the US or at least the perception of it following the long drawn-out wars in Iraq and Afghanistan has added complexities to an already uncertain and insecure Asia. Besides, the baggage of historical conflicts, unresolved border and territorial issues, and rising nationalism are further fuelling insecurities in the region.

Closer home, India-China relations have gone from one end of the spectrum to the other. Progress in the last decade has essentially been dictated by economic drivers. While trade between the two countries increased from US\$ 7 billion to over US\$ 70 billion, it has not altered the overall nature of the ties, which are invariably on a “simmering tension mode”. India and China being neighbours need to make significant political investment in changing the course of their bilateral relations. As

key powers in the emerging Asian strategic framework, the two countries have a responsibility in ensuring peace and stability in the region.

Unresolved border and territorial issues have continued to hold the bilateral relationship from realising its full potential. India and China have been on an “engaged mode” on the border issue since 1981. The Joint Working Groups (JWG), Special Representative talks and the successive political leaderships—Rajiv Gandhi during his visit in 1988, Atal Bihari Vajpayee during his visit in 2003, Manmohan Singh in his talks with Premier Wen Jiabao in 2005 and President Hu Jintao in 2006 and 2008—have taken up the boundary issue but the two sides have not been able to make any progress. The fact that the Line of Actual Control (LAC) is not demarcated or delineated on the ground or on military maps reflects the complexities involved as well as the inflexible positions the two countries adopt on the issue. Today, the LAC is a matter of perception. Both the militaries patrol up to the area that they consider is their territory. Between the two perceived lines is what is called the No Man's Land or the Red Zone, which is the overlapping area that both sides contest. This area has witnessed periodic patrol face-offs, although there has been no incident of firing since the Nathu La incident of 1967. There was, however, a serious standoff at Sumdorong Chu valley--the Wangdung incident of 1987.

Unlike on the Chinese side, which has a single unified commander who is responsible for the Tibetan Autonomous Region (TAR) forces, the Indian side of the border is managed by several different authorities including the Army, the Indo-Tibetan Border Police (ITBP), the Border Security Force (BSF) and the Assam Rifles. Consequently, the Chinese border is better managed; the Indian side also suffers from multiplicity of authority—in some places the Ministry of Home Affairs (MHA) is in charge through the ITBP and in others the Ministry of Defence (MOD)

through the Indian Army. India needs to bring about unity of command to strengthen its defenses along the border.

This Paper looks at the infrastructure on the India-China border. It is broadly structured into three sections. The first section details China's infrastructural developments along the border including highways, railway networks and oil pipelines that enhance its force deployment and sustenance capabilities. The second part looks at the significance of the Chinese military infrastructure and how it impacts upon India. The last section details India's initiatives on the border, the lacunae in its approach and gives a few policy recommendations that would help augment the infrastructure.

### **China's Initiatives in the Border Region**

Infrastructural development in the border region could impact in multiple ways, both positive and negative. On the positive side, it could strengthen regional connectivity, boosting economic linkages at a sub-regional level which may or may not impact the overall political relations between the countries. Overall, the benefits that can accrue to the border regions from trade cannot be overlooked. On the negative side, infrastructural upgradation could raise suspicions, up the ante and accentuate the possibility of a conflict along the border, as has been the case with India and China.

This section provides details of some of the major infrastructural networks created by China in the border areas. The highway network in the Tibetan Autonomous Region—the Western Highway, the Central Highway and the Eastern Highway—remains the most notable and has been significantly upgraded.

On the Western Highway, a stretch of 490 km has been tarred from Lhasa to Lhatse Dz. Tarring also been in progress up to Parkha (510 km) and according to some reports has been completed. Similarly, on the Eastern Highway, tarring has been completed from Lhasa to Ngiti (400) km. In addition, on the Central Highway, a 90-km stretch between Lhasa and Yangbajain has been developed as a four-lane highway. With these improvements, the assessed capacity of the highways in the TAR is estimated to be 7,100 tonnes per day.

Moreover, China has built a 1142 km-long electrified railway line from Golmud (Gormo in Tibetan language) to Lhasa and has plans to extend the line to Shigatse and Yatung, reaching almost till the strategic Nathu La pass.<sup>2</sup>



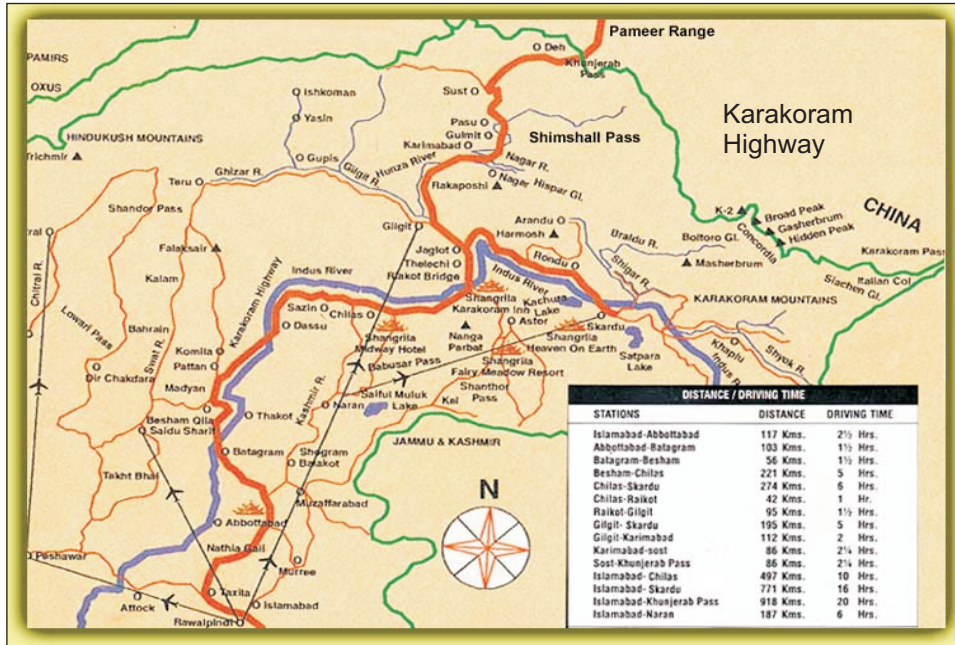
Source: "China Tibet Train: Train to Tibet Official Website," available at <http://www.chinatibettrain.com/tibet-train-map.htm>.

China is planning to extend the Golmud-Lhasa (Qinghai Tibet) railway line to Nyingchi (expected to be completed by 2013)<sup>3</sup>, close to its border with India on the Arunachal Pradesh side and further extend it to Dali in Yunnan Province. This line, running parallel to Arunachal Pradesh, will enable the PLA to rapidly relocate troops stationed in Kunming, Dali and Kaiyuanand to TAR. It would also enable the PLA troops, the 13 Group Army (Unit 56005), to relocate from Sichuan Province to TAR. This railway line has a capacity to run up to eight trains (one way) per day. It has been a significant achievement as it has reduced the traveling time from mainland China to Lhasa to two days with a total tonnage capacity of 3,200 tonnes per train. China has also developed four new airbases in Tibet in addition to three in southern China. Oil pipelines have been constructed from Gormo to Lhasa with a total capacity to transport five million tonnes of oil per year. Currently, to meet the limited demand in the TAR, the pipeline transports 1.25 million tonnes per year.

Meanwhile, there has been simultaneous refurbishing of the Karakoram highway (KKH) situated on the western front. This is again significant as it provides connectivity to both China and Pakistan.

While the Karakoram highway has been operational for many years, China is now in the process of building a rail network in the region. The KKH, the world's highest paved road, was completed in 1986 after 20 years of construction, connecting Pakistan's northern areas through the ancient silk route—a stretch of 1300 km running from Kashgar in Xinjiang to Havelian in Abbottabad in Pakistan. China, in addition, plans to establish a railway network beyond the KKH in PoK. From the Chinese perspective, these networks are significant as they become the shortest trading route as well as provide alternate energy supply routes from the Persian Gulf to Xinjiang.<sup>4</sup>





Interestingly, the KKH is also famously called the “Highway of nuclear and missile proliferation”.<sup>5</sup>

The following section compares the state of the infrastructure on the Chinese and the Indian side of the border. The data shows a stark contrast between the two: Chinese roads are almost up to the LAC or even further into the Indian side of the LAC, whereas most Indian roads stop well before the Indian side of the LAC. It is also significant that China has ensured connectivity in Aksai Chin by air.

### India-China Border Roads: A Comparison

	New Chinese Road: Head and Distance from LAC	Indian Road: Head and Distance from LAC
Western Sector	Chip Chap Trig Heights; 04 km on Indian side of LAC	Up to Indian perception of LAC (local road)
	Mabdola-Kongka La; 500 m short of LAC	Just short of Kongka La
	Sirijap – Pt. 4576; 4.5 km on our side of LAC	Nanglung Lungpa 15 km (being extended to Pt. 4433)
	Chutichangla – Area Bush; 100 m inside our perception of LAC	Pt. 4715 02 km
	Setting Imisla; 50 m short of Imisla Pass	Zursar 10 km

**Western Sector**



<b>Middle Sector: Opposite Himachal Pradesh</b>	Manza-Churup; Churup 03 km short of LAC (construction of road ahead of Churup in progress)	Sugar 04 km
	Tayak-Shipki; Shipki 06 km short of LAC (construction of road ahead of Shipki in progress)	Chuppan 05 km

<b>Middle Sector: Opposite Uttaranchal</b>	Bobra-Mana Pass; 01 km short of Mana Pass	Musapani (35 km) (being extended to Ghastoli)
	Lungi-Jindu-Niti; 02 km short of Niti	Malari (50 km)
	Lungi-Tunjun La; Tunjun La up to LAC	KM 16 (33 km)
	Pulan-Lipulekh; 700 m short of Lipulekh	Jibti (80 km) (being extended)

### Central Sector



<b>Eastern Sector: Opposite East Sikkim</b>	Asam-Jhandori Post-Dongchuila; 700 m short of Dongchuila	TR JUNC 03 km
	Sinchella-Batangla; 75 m short of Batangla	Bheem Base 03 km (being extended to Dokala)
	Sinchella-Dokala; 250 m short of Dokala	Bheem Base 03 km (being extended to Dokala)

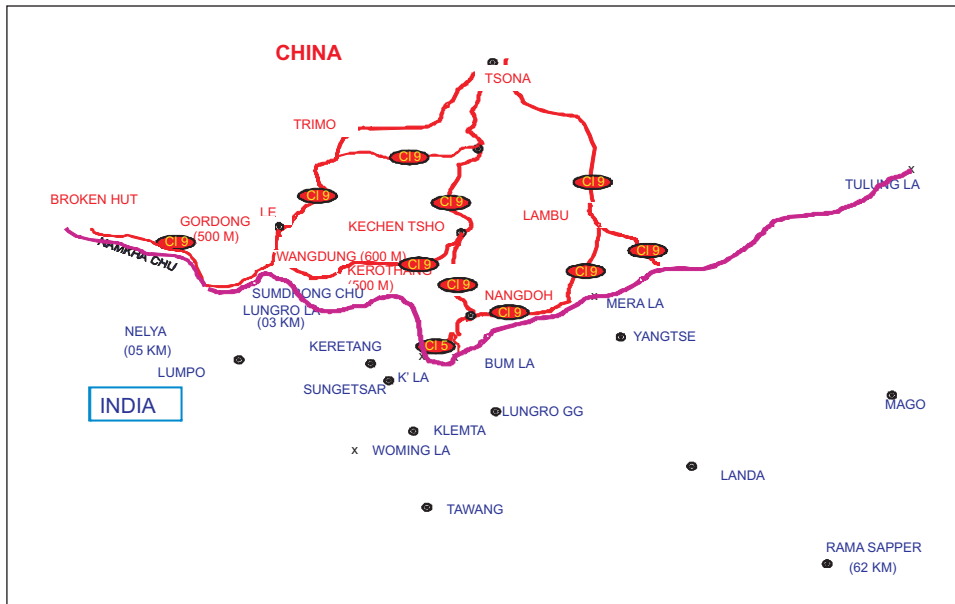
### Sikkim



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<b>Eastern Sector: Opposite Tawang</b>	Gordong-Broken Hut; 500 m from Gordong Camp	Nelya 04 km
	Le Camp – Wangdung; 600 m from Wangdung	Lungrola 03 km
	KechenTso-Kerothang; 500 m from Kerothang	Lungrola 03 km
	Nangdoh-Kharsang La; 200 m from Kharsang La	Sungestar 07 km

**Eastern Sector: Opposite Tawang**



<b>Eastern Sector: Opposite Eastern Arunachal Pradesh</b>	Chayaldz-Lung; Lung 12 km	Lemikeng 65 km (being extended to Taksing)
	Tadang-PurangYumjo; 04 km short of LAC	Lemikeng 65 km (being extended to Taksing)
	Bipung-Shirang; Shirang	Tuting 20 km (being extended to Bona)

### Eastern Sector: Opposite Eastern Arunachal Pradesh



What do these developments mean for India? While there may be many consequences, the implications in military terms are far more significant. If China were to maintain Tibet as a buffer zone, as was done by the British, the infrastructural buildup is understandable as it would allow the PLA to deploy a large number of military forces on the border and sustain them for relatively longer periods. More so now as a number of oil pipelines and depots have been established in the border areas. It is estimated that the PLA would be in a position to deploy and sustain 30-32 divisions, including 5-6 rapid reaction divisions, increasing from the current strength of 20-22 divisions.

#### Significance of Improved Infrastructure

Improved infrastructure has a critical role in enabling a nation to apply military power. On the India-China border, there is a clear military imbalance—not just in terms of equipment and forces on the border but

also in terms of the physical infrastructure. In the last decade, China has made tremendous improvements in the infrastructure in the TAR and the Sino-Indian border. With the massive upgradation, China now has a 40,000 km road network in Tibet and rail links such as the 1,142 km link between Lhasa and Gormo in Qinghai Province. The improved network has enabled China to amass large number of forces by train and road in a relatively short span of time. This exercise earlier took about six months and was not possible during winters. China has also established multiple air bases and forward airstrips near the border.<sup>6</sup> All these measures have made movement of troops as well as shifting of logistic supplies much easier. On the Indian side, many of the roads stop 60 to 80 km before the LAC, thus affecting troop deployment and forward presence.

The PLA troops remain acclimatized as the military camps are established close to the border (these are not cantonments). There are only a few divisions on the Indian side of the border with most of the border forces being based in the plains of Assam. Given that these forces are virtually at sea-level, acclimatisation before deployment in the border becomes a major challenge for the Indian troops.

China has approximately 160,000 troops in Tibet (on border guard and law and order duties). With the upgraded infrastructure network, it is capable of mobilising an additional 100,000 troops from the Central Reserve within six weeks.<sup>7</sup> Moreover, with the improved infrastructure for air operations, China is equipped to deploy heavy lift planes in Tibet. Nevertheless, difficulties to land and take off fully loaded due to altitude and weight restrictions are an issue. Deployment of intermediate range ballistic missiles (IRBMs) such as DF-4 and DF-21 is also noteworthy. There have been reports indicating that China could deploy DF-31 intercontinental ballistic missiles (ICBMs) at the Delingha base close to Tibet. The fact that China has a modernised logistics system with digitised

tracking of logistics assets and automated inventory control, which have been tested in military exercises, enables swiftness and efficiency during joint operations. In the Indian context, it is particularly relevant that China has established a logistics park close to the railway and highway networks in the TAR. A key logistics centre set up in Nagqu Township in the TAR in 2009 caters to Lhasa, Qamdo, Ali and northern Shigatse. The centre provides assistance in the areas of freight transportation, storage packaging, processing, distribution and information transaction. The centre is estimated to handle 2.2 million tonnes of cargo by 2015 and 3.1 million tonnes by 2020. This would include raw minerals (Nagqu is ripe for mineral exploitation and animal husbandry development), herbs, building materials and other goods.<sup>8</sup>

The augmentation of China's air mobile reserve forces that can be flown in rapidly from the East to the Indian borders is significant.<sup>9</sup> These forces have rapid reaction units which, equipped with small arms and light weapons, can be airlifted<sup>10</sup> or sealifted to any terrain (desert, swamp or mountain) in just 10 hours after an order is issued.<sup>11</sup> Even though high altitude and related restrictions are issues, they are being addressed by lengthening the runways. Development of these forces is significant given that they enhance PLA's ability to engage in short and swift operations.<sup>12</sup>

There have been intense debates on the use of air power and its relevance in high altitude areas. The fact that China has established air support infrastructure in high altitude areas suggests that India should not rule out such operations. India fought a high altitude air war with Pakistan in Kargil. It has also augmented its strategic airlift capabilities in the border regions with the induction of heavy transport aircrafts, including the C-130J.

China's inventory of tanks has not been considered seriously in the Indian context given the mountainous terrain of the border region. However, it is a factor, particularly in the Ladakh sector, where once the mountains are crossed the region presents itself as a high altitude desert. Moreover, China's artillery with long-distance heavy calibre guns capable of firing up to 40 km-plus are of significance in this context.

Compared to China's augmented capacities to apply military power in the border regions, the Indian leadership's approach—political, military and civilian bureaucracy—comes across as narrow and naïve. This approach, guided by the argument that improvement in the border infrastructure would facilitate the Chinese, has however undergone a change in the recent past.

In 2010, Defence Minister A.K. Antony while addressing a function organised by the Border Roads Organisation (BRO) said, “Earlier the thinking was that inaccessibility in far-flung areas would be a deterrent to the enemies.” He acknowledged that this was an “incorrect approach” and stated that the government has decided to upgrade roads, tunnels and airfields in the border areas.<sup>13</sup> Border Road Organisation Director Lt. Gen. A.K. Nanda, speaking in a similar vein, stated that border infrastructure development was not undertaken earlier “by design”, adding, “our approach has changed and we are building on our capacity, modern equipment and workforce”.<sup>14</sup>

Whatever the logic, an underdeveloped border region has serious consequences for India—the primary one being the inability to deploy forces on time. This could complicate India's options and lead to an unfavourable outcome, particularly in the initial stages of a conflict.



### **India's Border Infrastructure Initiatives**

As mentioned above, India adopted a narrow approach to border infrastructure projects. With the result that it takes 20 hours to drive a distance of 500 km (300 miles) from Guwahati to Tawang—a reflection of the deplorable condition of the road network in the region. It was only in 2006 that the Cabinet Committee on Security, Government of India, approved some of the major road and other infrastructural projects in the border region. The decision entailed building of 72 roads, three airstrips and several bridges in the border areas.<sup>15</sup> It was expected that these measures would have a significant impact on the Indian military's ability to “swiftly move forces into the region and sustain them logistically in the event of any untoward trouble or emergency”.<sup>16</sup> As of 2010, only nine of the 72 roads have been completed. The delays have been attributed to pending and delayed clearance and other administrative processes of the Ministry of Environment and Forests, as well as shortage of appropriate and adequate men and machinery. Inadequate funding has also been cited as a reason, but a study of some of the Comptroller and Auditor General (CAG) reports reveals that a significant amount of money has remained unspent. For instance, the report submitted to Parliament in May 2010 records that the unspent amount on border infrastructure and other security-related spending in 2008-09 was to the tune of 58 per cent. In addition, it pointed out that apart from the supplementary grants that remained unused, 97 per cent of the regular funds were not used between 2006 and 2009.

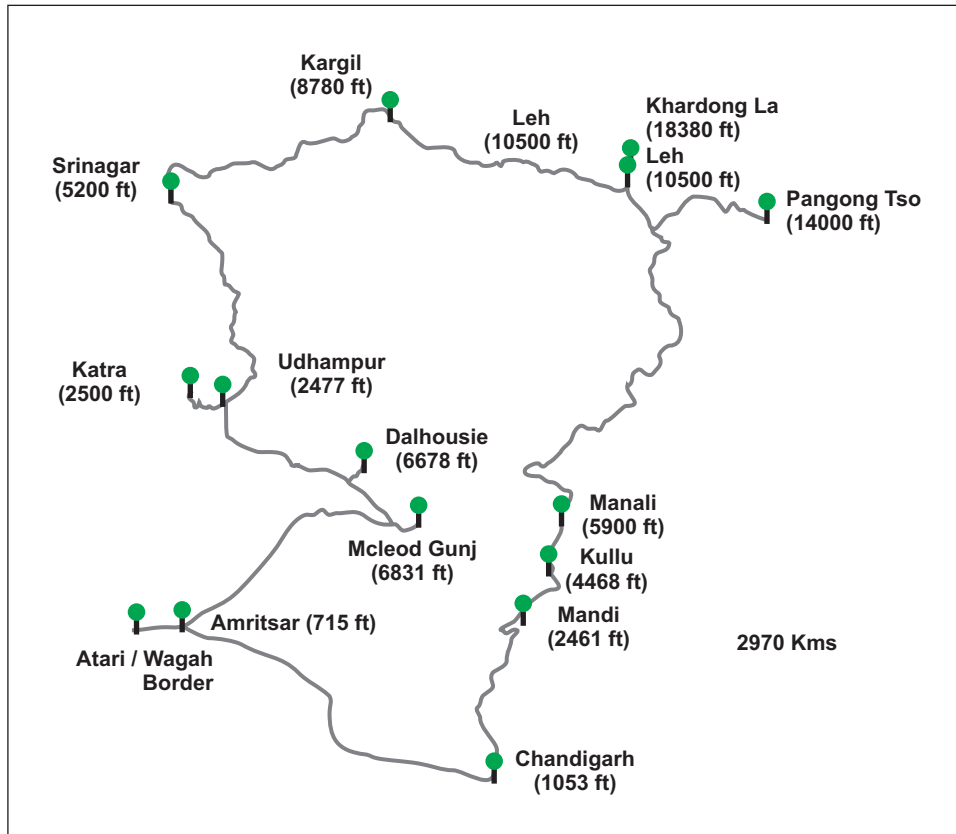
The Central government in 2009 made an investment plan of US\$ 3 billion for establishing road networks in the border areas. Reports indicated that this amount was meant for upgradation of advanced landing grounds, airfields and construction of roads. For the first time, these projects were opened up to the private sector to enable timely

implementation. Until then, the engineers of the Indian Air Force or the BRO remained solely responsible for these projects.

In another announcement in 2005, the Ministry of Road Transport and Highways made a 100-day agenda allocating Rs. 13,397.2 crore (US\$ 2.8 billion) for road construction in Jammu and Kashmir and the Northeast. The government also mandated deadlines for many of these critical projects. Projects in Jammu and Kashmir include four-laning of the Jammu-Srinagar national highway (NH-1A); improving the national highway 1D (Zozila-Kargil-Leh road); and construction of a 3 km two-lane road at national highway 1B (Batot-Kishtwar). BRO is implementing some of these projects at an estimated cost of Rs. 100 crores. Additionally, the Ministry cleared two other projects worth Rs. 768 crores for the region.<sup>17</sup>

The four-laning of the NH-1A was considered originally as part of the North-South corridor project but because of the prohibitive cost it was taken separately. This new road will reduce the distance between Jammu and Srinagar by 60 km.<sup>18</sup> The road would be accessible 24/7 with no interruption during snow in winters, which has been a seasonal problem that the authorities have been dealing with. Presently, the road is closed over for six months with essential supplies being transported to the region by air. Similarly, upgradation of NH-1D is significant as it is one of the only two roads that connects Ladakh with the rest of the country—the other being the Leh-Manali highway. It is telling that this road was categorised as a National Highway only in 2006.<sup>19</sup>

### Roads Leading to Srinagar and Leh: NH-1D and NH-1A



In May 2010, the BRO undertook construction of 61 roads, covering a stretch of 3,429 km, in addition to 285 roads with a total length of 4,890 km and an all-weather road to Ladakh. The BRO has also been directed to finish construction of the roads stretching from Ladakh to Diphu La in Arunachal Pradesh (around 608 km at a cost of Rs. 992 crores). Moreover, the government has sanctioned development of four strategic roads in Ladakh. While timelines have been set for completing these projects, the agencies involved in constructing the roads, including the BRO, feel that the timeframes imposed on them are “unrealistic”. Besides, the agencies are critical of the bureaucratic hurdles they face—even before the project commences.

India's initiatives in the middle and western sectors of the border are also equally sensitive and significant. However, the progress has been slow on both these fronts. In January 2008, a package was announced for the construction of a rail link between Harmuti (a small town in Assam, located 33 km south of Itanagar) and Itanagar.<sup>20</sup> Other major projects in the region include two-laning of trans-Arunachal highway from Nechipu to Hoj; and Potin to Pangin; upgradation of Stillwell road in Arunachal Pradesh; and four projects of two-laning of roads, including national highway 154 in Assam. The road density of Arunachal Pradesh is at a deplorable level of 18.65 km per 100 sq km, as against the national average of 84 km per 100 sq km.

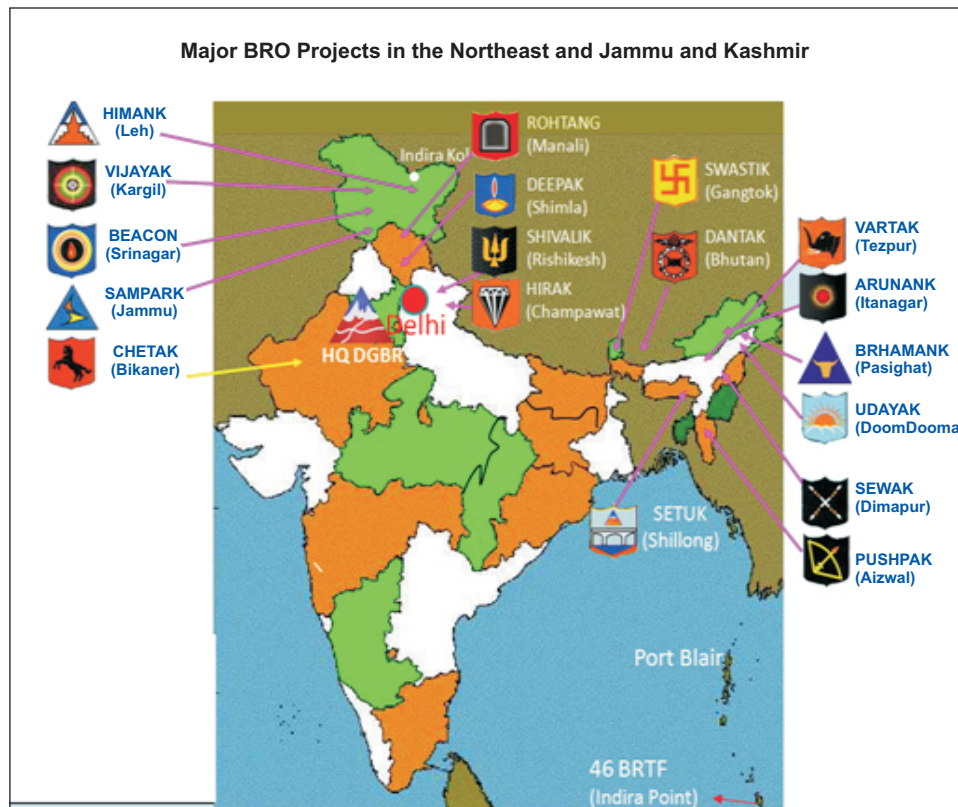
#### Stillwell Road: Connecting India and China through Myanmar



The Trans-Arunachal stretch between Nechipu and Hoj is being undertaken at an estimated cost of Rs. 1486 crore and developed by IVRCL-Sushee consortium which will build, operate and maintain the road for around 12 years.<sup>21</sup> This road will strengthen the connectivity

within the state in the western districts, such as Seepa and Bomdila with Itanagar, in addition to adding to the border regional connectivity to safeguard national security. Upgradation of the Stilwell road in Arunachal Pradesh would help strengthen regional connectivity among the northeastern states and help open up direct trade routes to Myanmar and Thailand.

The road network in Sikkim requires urgent attention as the current road density is just 28.45 km per 100 sq km. There is just one road linking Gangtok and Nathu La and one landslide-prone road with a width of 5 m, connecting the state with the rest of India. The railway network in the region is next to nil with no trains to India's northeastern states of Sikkim, Tripura, Meghalaya, Mizoram and Arunachal Pradesh.<sup>22</sup>



While there has been considerable progress in infrastructure projects along the Indian side of the border, the road projects are lagging behind. Some of the major projects in the eastern and middle sectors include Swastik; Vartak; Arunank; Brahmank; on the western sector, they include Himank; Vijayak; Beacon and Sampark.

Out of the total of 61 roads (3000-plus km) planned in the areas bordering China, only 15 (500-plus km) have been completed. 27 of the total planned roads (approx. 1200 km) are currently being constructed and are expected to be finished within the stipulated timeframe. However, 19 roads (approx. 1550 km) are currently delayed due to many reasons. It is reported that around 50 per cent of the connecting roads have been tarred and in around 75 per cent, laying of roads has been completed. A few other road projects have been held up, including the Flaghill-Dokala road in Sikkim.<sup>23</sup> While connectivity has been established in a small portion of these 19 roads, most of them are yet to be fully connected. These projects are expected to be completed by the end of 2016. There are approximately 20 tunnels covering a stretch of 140 km to be constructed, of which only the Rohtang is in progress as of now. This momentum may pick up as the tunneling rate per day is expected to increase from 6 to 20 m in the next few years.

### **India's Border Projects: Contextualising the Problem**

Rationally analysed, the timeframes set for the BRO seem unreasonable. Due to the flawed Indian approach of not developing the border regions, most of these border roads leading to Gangtok, Tawang, among other places, are single-lane roads. The planners of the last five decades never visualised the importance of these roads nor the huge volume of traffic that flows through them today. As a result, the situation today is that there is a heavy burden to construct new roads while increasing the capacity of

existing roads. Also bridge-road construction ratio is skewed in favour of roads at 5 km of road as against 9 m of bridge construction per day.

The delays are due to many reasons. For instance, while the projects were initiated in 2007, the funding and clearances from different ministries including from that of Environment and Forests came much later in 2009/ 2010. This meant that the actual project implementation began only in 2010-11 and therefore most of the deadlines for 2012 could not be met. Scarcity of raw materials required for construction, shortage of officers, poor quality of labour as well as contractors and insecurity in the region are among the other hurdles that have delayed many of the projects.<sup>24</sup> Moreover, the areas along India's border with China are prone to natural calamities such as cloudbursts, avalanches, landslides and earthquakes, which have further derailed projects. BRO has also been bogged down by red tapism, problems in training of personnel and lengthy and time-consuming land acquisition processes.

The terrain adds another layer of complication. The Himalayas, being a young-fold mountain range, are still rising which means that the construction has to take place on fissured rocks mixed with clay. Given the north to south flow of rivers on the Indian side, creating lateral connectivity is hindered. The altitudes at the Indian side of the border also increase dramatically over short distances rising from near sea level to 17000 feet. This creates problems in building road infrastructure as valleys and high mountain passes have to be crossed to reach the border.

However, on the Chinese side, the altitudes of the Tibetan plateau remain almost the same (variation of 2000-3000 feet), making it much easier to construct roads and railways. On the Indian side, developing inter-valley connectivity is possible but significantly challenging. Once the initial projects are completed, the BRO could take up the task of creating lateral

connectivity as well. Moreover, construction on the Indian side of the border is hampered by heavy monsoons; Tibet receives far less rainfall.

In addition to the above requirements of strengthening/developing connectivity, agencies including BRO are required to maintain strategic roads in the border region, which run up to about 22,000 km, and around seven air fields.

### **Conclusion**

A strengthened border infrastructure is of utmost importance for India. In an era of globalisation, regional and sub-regional economic and trade linkages are vital drivers of economic growth and prosperity. Improving border connectivity in order to facilitate stronger linkages with Myanmar, Thailand and other Southeast Asian countries should be an added imperative for the country.

Given the baggage of history as well as the increased emphasis on hard power, infrastructural projects that would augment mobility of forces and systems, thereby enabling application of military power, should be considered as a high priority. The comparative exercise in the paper shows that India is significantly lagging behind. India must attempt at closing some of the critical gaps in order to meet any challenge on the border effectively.

India should reconsider its border management approach with an objective of effective planning and speedy implementation of border infrastructure projects. A body such as the Cabinet Committee on Security (CCS) should be made responsible for oversight of critical projects. The CCS should also include the Ministry of Environment and Forests while dealing with border infrastructure projects. It could also



entrust the responsibility on a national level coordinator for getting all the clearances and timely implementation of border projects.

The advantages of reviving the original concept behind the creation of the Sahastra Seema Bal (SSB) should be considered. The concept originally attempted to include the local population in these areas to contribute to the region's defence in times of conflict. The renewed concept could be along the lines of the Territorial Army under the control of the Ministry of Defence.

The need to establish unity of command in border management is urgent. India must move away from its current practice of multiple agency involvement and establish better coordination and efficiency among the various border forces under a single command.

Above all, responsibility must be fixed for periodic monitoring and auditing of projects under implementation.

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**Endnotes:**

1. This Paper is an updated version of a previous ORF publication on the subject published in August 2010. This paper has also benefitted from a closed-door discussion held on the subject at ORF in 2012.
2. For a detailed study on China's railway development plans, see Environment and Development Desk, Department of Information and International Relations, Central Tibetan Administration, Dharamshala, Himachal Pradesh (India), *China's Railway Project: Where will it take Tibet?*, August 2001, available at [http://tibet.net/wp-content/uploads/2011/08/rail\\_report.pdf](http://tibet.net/wp-content/uploads/2011/08/rail_report.pdf).
3. China Tibet Train, Train to Tibet Official Website, available at <http://www.chinatibettrain.com/lhasa-to-nyingchi.htm>.
4. Reports indicate that China's new railway links to Pakistan could connect China to Chabahar in Iran. China is also reportedly considering a railway network from the Northwestern city of Mashhad on the Eastern border of Iran up to the port of Chabahar. For details see, "Chinese may build railway line from Mashhad to Chabahar," September 10, 2009, available at [http://www.steelguru.com/middle\\_east\\_news/Chinese\\_may\\_build\\_railway\\_line\\_from\\_Mashhad\\_to\\_Chabahar/111068.html](http://www.steelguru.com/middle_east_news/Chinese_may_build_railway_line_from_Mashhad_to_Chabahar/111068.html).
5. Few years back, American satellites detected the movement of 12 consignments of Chinese missiles to Pakistan via Karakoram Highway. The silkworm missiles that China got in trouble for selling to Pakistan came only through Karakoram route, whose bridges are reconstructed to handle heavy freights. Also, North Korea received Uranium enrichment equipment from the A.Q. Khan network through this route only. See, Pak-Iran nuclear nexus: UN confirmation, *India News Online*, September 01, 2003, available at [http://74.125.153.132/search?q=cache:2gpAqLjg5LMJ:news.indiamart.com/news-analysis/pak-irannuclearnexus874.html+Karakoram+highway,+Missile,+proliferation&cd=11&hl=en&ct=clnk&gl=in;Karakoram Highway In China](http://74.125.153.132/search?q=cache:2gpAqLjg5LMJ:news.indiamart.com/news-analysis/pak-irannuclearnexus874.html+Karakoram+highway,+Missile,+proliferation&cd=11&hl=en&ct=clnk&gl=in;Karakoram+Highway+In+China), available at <http://factsanddetails.com/china.php?itemid=441&catid=15&subcatid=104>; and Richard Bond, The Proliferation Security Initiatives:

Targeting Iran and North Korea , Occasional Paper on International Security Policy, Number 53, January 2003, British American Security Council.

6. Hari Sud, "China's Designs on India's Northeast," *UPI Asia*, March 25, 2008, available at [http://www.upiasia.com/Security/2008/03/25/chinas\\_designs\\_on\\_indias\\_northeast/7412/](http://www.upiasia.com/Security/2008/03/25/chinas_designs_on_indias_northeast/7412/).
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8. "Key Railway Logistics Center Set Up in Tibet," *Xinhua News Agency*, August 18, 2009, available at [www.china.org.cn/china/news/2009-08/18/content\\_18352718.htm](http://www.china.org.cn/china/news/2009-08/18/content_18352718.htm).
9. China's indigenous production and the recent flight test of heavy transport aircraft Y-20 is of significance. "China's Heavy Transport Aircraft Y-20 Takes First Flight," *Global Times*, January 27, 2013, available at <http://www.globaltimes.cn/content/758410.shtml>.
10. China's airlift capabilities are not necessarily adequate since they have a small number of IL-76s. PLAAF is reported to have 18 of them and they have placed an additional order for 30. As of November 2012, Sergei Kornev, head of Rosoboronexport's aviation equipment department, stated that the Russian exporter Rosoboronexport and the Ukrainian counterpart, Ukrspetsexport were involved in selling new and old IL-76s to China. The TAPO plant located in Tashkent is also reported to have sold IL-76s to Beijing. Each IL-76MD is capable of carrying 190 troops or 3 armoured vehicles over a distance of 6,100 km and capable of dropping them directly to enemy zone. The aircraft's airdrop and cargo handling equipment allows it to load, unload and airdrop paratroopers, material, and cargo quickly. In addition, the avionics onboard is capable of executing airlift and airdrop missions day and night in VFR (visual flight rules) and IFR (instrument flight rules) weather conditions as well as under hostile air defence conditions. These are decisive advantages for the PLAAF. For details on Chinese transport inventory, see IISS *Military Balance* and "IL-76MD Transport Aircraft", SinoDefence, available at <http://www.sinodefence.com/airforce/airlift/il76.asp>; and Vladimir

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  12. India should take cognizance of these developments and be prepared to face quick, short military operations by China as they continue to make political assertions on the border.
  13. Vivek Raghuvanshi, "India to Modernize Road Networks in Border Areas," *Defence News*, May 07, 2010, available at <http://www.defencenews.com/story.php?i=4616391>.
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  17. "Government to Revamp Road Infrastructure in Kashmir, Northeast," *The Indian News*, June 30, 2009.
  18. Pranab Dhal Samanta, "A New Road to Srinagar: No Winter Shut-downs, 60 km Less, Four Lanes," *Indian Express*, February 18, 2007, available at <http://www.indianexpress.com/news/a-new-road-to-srinagar-no-winter-shutdowns-60-km-less-four-lanes-----/23623/#sthash.Xde9b1dn.dpuf>.

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24. According to sources within the government, a shortage of personnel in the BRO is to the tune of nearly 6000.

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